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09/183,479	10/30/1998	MICHAEL JAMES LIBERATORE	SAR12743	3193

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EXAMINER

MAYES, MELVIN C

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 28

Application Number: 09/183,479
Filing Date: October 30, 1998
Appellant(s): LIBERATORE ET AL.

Birgit E. Morris
For Appellant

EXAMINER'S ANSWER

MAILED
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GROUP 1700

This is in response to the appeal brief filed January 6, 2003.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that the following groups of claims do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

Group I – Claims 1-3

Group II – Claims 4-7

Group III – Claims 9 and 11

(8) *Claims Appealed*

A substantially correct copy of appealed claims 1-7, 9 and 11 appears on page 14-15 of the Appendix to the appellant's brief. The minor errors are as follows: Claim 1, line 3 should read "directly into the surface" instead of "directly **on** the surface" and Claim 1, line 7 should read "channel" instead of "channels."

(9) *Prior Art of Record*

4,546,065	AMENDOLA et al.	10-1985
5,028,473	VITRIOL et al.	7-1991
5,277,724	PRABHU	1-1994

"Low Dielectric Constant Pockets In Multilayer Ceramic Modules," IBM Technical Disclosure Bulletin, vol. 17, issue 3 (August 1, 1974), pp. 862-863

(10) *Grounds of Rejection*

The following ground(s) of rejection are applicable to the appealed claims:

(I)

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over IBM Technical Disclosure Bulletin (August 1974) in view of Amendola et al. 4,546,065.

IBM Technical Disclosure Bulletin (August 1974) discloses a method of making a multilayer ceramic module comprising: providing ceramic green sheets, forming recesses in the green sheets by mechanically stamping; filling the recesses with metal paste by screen-printing, laminating green sheets and firing. The IBM Bulletin does not specifically state that stamping involves using an embossing tool under heat and pressure.

Amendola et al. teach that embossing grooves and pads into a ceramic green sheet involves pressing against the surface of the greensheet, a die which carries a raised mirror image of the desired pattern so that after removal of the die, the greensheet carries the desired pattern as indentations or recesses. Embossing conditions involve heating the greensheet to a temperature at which the binder in the greensheet flows and can be shaped under pressure such as 75° to about 95°C and pressure of 500 to 3000 psi (col. 7, lines 3-33).

It would have been obvious to one of ordinary skill in the art to have mechanically stamped the recesses in the greensheets in the method of IBM (August 1974) by using a die having a raised mirror image of the pattern and pressing against the greensheets under heat and pressure as taught by Amendola et al. as used to emboss grooves and pads into a ceramic green sheet, the embossing conditions involving heating the greensheet to a temperature at which the binder in the greensheet flows and can be shaped under pressure. Mechanically stamping the

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recesses in the greensheets by using a die under heat and pressure would have been obvious to one of ordinary skill in the art as taught by Amendola et al.

Screen printing the green sheets using a silver screen printing paste of silver powder and having of a viscosity of about 30 poise would have been obvious to one of ordinary skill in the art as silver is well known in the art of making multilayer ceramic modules as a metal used in metallic paste used to make a multilayer ceramic module and as about 30 poise is a suitable viscosity for a paste for screen printing conductor patterns in the indentations in the green sheets and would have been obvious to one of ordinary skill in the art.

(II)

Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to Claim 1, and further in view of Vitriol et al.

Vitriol et al. teach that in a multi-layer co-fired ceramic, electrical circuit patterns on the green sheets include not only metallizations but may further include resistors, capacitors, inductors and other electrical components compatible with the process, the patterns formed on the sheets by screening or any other suitable method (col. 4, lines 57-63).

It would have been obvious to one of ordinary skill in the art to have modified the method of the references as combined for making a multi-layer ceramic module by also screen printing resistors, capacitors or inductors in the recesses in the green sheets as taught by Vitriol et al. as also screened on green sheets for making a multi-layer, co-fired ceramic laminate. Screen printing the green sheets with conductive paste to form inductors, with resistor paste, or with capacitor paste would have been obvious to one of ordinary skill in the art as Vitriol et al.

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teach that in a multi-layer co-fired ceramic, these electrical components may also be included by screen printing.

Screening capacitors using an ink or paste of lead magnesium niobate or barium titanate, as claimed in Claims 6 and 7, would have been obvious to one of ordinary skill in the art as these materials conventionally used for capacitors.

(III)

Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to Claim 1, and further in view of Prabhu 5,277,724.

Prabhu teaches that multi-layered, co-fired ceramic on a metal base is formed by utilizing a bonding layer of low softening point glass and co-firing to bond the ceramic to the metal base. The bonding layer of glass provides a means of attaching the multi-layered ceramic to the base and minimizes shrinkage of the ceramic during the firing (col. 1, line 55 - col. 2, line 48).

It would have been obvious to one of ordinary skill in the art to have modified the method of the references as combined for making a multilayer ceramic module by co-firing the laminated green sheets on a metal base using a low melting bonding layer of glass as taught by Prabhu for attaching a multi-layered ceramic to a base and minimize shrinkage of the ceramic during firing.

(11) Response to Argument**(I)**

Appellant argues that the present invention is directed to making opening in green tapes particularly suitable for use as transmission lines while the IBM reference is directed to making openings in green tape that are at least partially filled with air after firing. Appellant argues that no lines of any sort are suggested by IBM and thus the purpose of the IBM reference is different, argues that no mention is made of applying heat or pressure while making the channels or openings, and argues that the channels are deliberately not to be wholly filled in the finished product, as contrasted to the product of Appellants. Appellant argues that the IBM has been cited in hindsight and does not suggest making a similar product in a similar way.

Appellant argues that the method of Amendola et al. requires two firing steps, one after forming the channels or openings and a second after the channels or openings are filled with a metal paste; while the present method does not require two firing steps. Appellant argues that there is not reason to combine IBM with Amendola et al. except in light of hindsight.

Appellant claims in Claims 1, "embossing a channel or opening directly into the surface of a green tape..." and "screen printing a suitable ink into the channel or opening to fill the channel or opening." The IBM Technical Disclosure Bulletin reference discloses a method of making a multilayer ceramic module which includes steps of forming recesses of desired conductor pattern in ceramic green sheets by mechanically stamping and filling some recesses with metal paste by squeegeeing (i.e. screen-printing) while filling other recesses with a filler paste. Even Appellant admits that the IBM reference is directed to forming "openings" in green

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tape, and because the recesses of IBM are in a desired conductor pattern, the reference does disclose or suggest a "channel" as claimed. Further, as shown in the Figure 2, some the recesses (channels or openings) are completely filled with metal paste 7. It is only after firing that some of the recesses have air gaps, not in the recesses filled with metal paste but in the recesses which were filled with filler paste 8.

Appellant's broadly claimed steps of "embossing a channel or opening" and "screen printing a suitable ink into the channel or opening to fill the channel or opening" are disclosed or suggested by the IBM reference because the reference does fill at least one recess with metal paste even though some of the recesses are filled a filler paste instead of metal paste. Further, even though some of the recesses of the IBM reference are filled with a filler paste instead of a metal paste, Appellant claims "a suitable ink" which is not limited to just a metal paste. With respect to Appellant's argument that the IBM reference is making a different product, the reference is making a similar product to that to be made by the method as claimed by Appellant, the product being a multilayer ceramic product made using a green tape (sheet) having a channel or opening filled with a suitable ink.

At issue is whether it would have been obvious to one of ordinary skill in the art to have mechanically stamped the recesses of desired conductor pattern in the green sheets using an embossing tool having the desired pattern using heat and pressure, as claimed. Amendola et al. is pertinent because the reference teaches that grooves can be embossed into a ceramic green sheet by pressing against the surface of the greensheet a die which carries a raised mirror image of the desired pattern and teaches that the embossing conditions involve heating the greensheet to a

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temperature at which the binder in the greensheet flows and can be shaped under pressure such as 75° to about 95°C and using pressure of 500 to 3000 psi (col. 7, lines 3-33).

While Amendola et al. uses two firing steps in its particular method, the teaching relevant to the method of the IBM reference is how to mechanically stamp (i.e. emboss) patterns into a green sheets. As taught by Amendola et al., this clearly involves using a die (embossing tool) having the desired pattern and using the die under heat and pressure, the heat required to cause the binder in the greensheet to flow. The Examiner's position is that it would have been obvious to one of ordinary skill in the art to have mechanically stamped the recesses in the greensheets in the method of the IBM reference by using a die having a raised mirror image of the pattern and pressing against the greensheets under heat and pressure, as taught by Amendola et al., as used to emboss grooves into a ceramic green sheet, the embossing conditions involving heating the greensheet to a temperature at which the binder in the greensheet flows so that the greensheet can be shaped under pressure.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon references combined in hindsight, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this case, the references are not combined in hindsight but combined in view of looking to Amendola et al. to teach the particulars of how green sheets are mechanically stamped or embossed with patterns. As taught by Amendola, the use of a die under

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heat and pressure to emboss (mechanically stamp) patterns into a green sheet is knowledge which was within the level of ordinary skill at the time the claimed invention was made.

(II)

Appellant argues that Vitriol et al. does disclose that one can print screen capacitors, resistors and the like on green tapes but does not disclose pre-forming openings other than via holes nor disclose or require embossing.

Appellant admits that Vitriol et al. disclose that one can print screen capacitors, resistors and the like on green tapes. This is the very teaching of Vitriol et al. that is relevant to the method of the IBM reference as combined with Amendola et al. Appellant does not argue that it would not have been obvious to one of ordinary skill in the art to have screen printed resistors or capacitors in recesses in the green sheets of the IBM reference, as set forth in the rejection. As previously set forth by the Examiner, pre-forming a channel or opening by embossing under heat and pressure is suggested by the IBM reference and Amendola et al. Appellant has not presented any other arguments as to why the limitations of Claims 4-7 are patentable over the combination of references as applied.

(III)

Appellant argues that Claims 9 and 11 not only require embossing channels or openings but also require burying the embossed and filled green tape in a green tape stack and aligning and laminating the stack onto a metal support board and then firing. Appellant argues that Prabhu does disclose adhering a green tape stack to a metal support board but does not discuss or

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suggest embossing to form any type of pattern in a green tape. Appellant argues that the combination of Prabhu with the other references is based on hindsight.

With respect to burying the embossed and filled green tape in a green tape stack, the IBM reference discloses making a multilayer ceramic module by laminating green sheets. Such multilayer ceramic modules made by laminating green sheets are made by laminating a plurality of green sheets. Thus at least one green sheet having recesses would be buried in a green tape stack, as claimed.

Appellant admits that Prabhu discloses adhering a green tape stack to a metal support board. Prabhu teaches adhering a multi-layered ceramic on a metal base by a bonding layer of low softening point glass and co-firing to bond the ceramic to the metal base, the bonding layer of glass providing a means of attaching the multi-layered ceramic to a base and minimizing shrinkage of the ceramic during the firing. This is the very teaching of Prabhu that is relevant to the method of the IBM reference as combined with Amendola et al., and Prabhu provides motivation for bonding a multi-layered ceramic to a metal base by glass, the motivation being to attach the ceramic to a base while minimizing shrinkage of the ceramic during firing. Pre-forming a channel or opening by embossing under heat and pressure is suggested by the IBM reference and Amendola et al. as previously set forth.

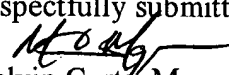
In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the

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time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The teaching of Prabhu of laminating a multilayer ceramic stack to a metal base before firing is knowledge within the level of ordinary skill at the time the claimed invention was made, and thus the conclusion of obviousness is not based upon improper hindsight.


For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,


Melvin Curtis Mayes
Primary Examiner
Art Unit 1734

MCM
March 18, 2003

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